

IN THE CLAIMS

Please amend Claims 1 through 8; please cancel Claim 3.

1. (Currently Amended) A method of fabricating a ~~buried ribbon semiconductor laser~~ structure, said method comprising: including the successive steps of:

providing a III-V material (3-1);

(b) forming a p-doped confinement layer (16) ~~on top of~~ overlying the [[a]] III-V material substrate[[,]];

(c) ~~then~~ forming a thin n-doped layer (17) ~~on top of~~ overlying said p-doped confinement layer[[,]];

(d) ~~grown an then forming a laser active layer (4) on top of~~ overlying said p-doped confinement layer[[,]];

(e) forming a thin n-doped layer overlying the active layer;

(f) locally etching said active layer, said thin n-doped layer and said p-doped confinement layer to form a rectangular-shaped mesa (11), the rectangular-shaped mesa having a ribbon, the ribbon referring to the active layer after etching including a ribbon of said active layer[[,]]; and

(g) burying said rectangular-shaped mesa ribbon in an n-doped burying layer (19) so that ~~all lateral faces of said ribbon are adjacent the [[an]] n-doped layer, said lateral faces including a top face, a bottom face and two side faces joined to the top and bottom faces, the rectangular-shaped mesa having a first lateral (top) surface, a second lateral (a first side) surface, a third lateral (a second side) surface, and a fourth lateral (bottom) surface;~~

wherein the first, second and third lateral surfaces (42, 43, 44) of the rectangular-shaped mesa are surrounded by the n-doped burying layer (19), and the fourth lateral surface (41) by the thin-n-doped layer (17);

wherein the thin n-doped layer (17) separating the p-doped confinement layer (16) and the ribbon (4) so that there is no migration of p dopant toward the active layer.

2. (Currently Amended) The method of Claim 1, wherein the burying step (g) comprises: claimed in claim 1 applied to a p-doped III-V material wafer, which method further includes, after step (g) of burying said ribbon in said burying layer, the successive steps of:

(g1) etching to reduce the width of said burying layer, to remove portions on either side of said mesa but not adjacent said mesa so that after such etching said ribbon is still buried in said burying layer, the etched burying layer having a reduced width, a top surface and surfaces substantially perpendicular to the plane of the top or bottom faces of said ribbon[.]; and

(g2) masking said top surface of said burying layer of reduced width and depositing a dielectric material insulative layer so that said insulative layer covers lateral surfaces of said burying layer and portions of said p-doped confinement layer on either side of said mesa.

3. (Cancelled) The method claimed in claim 1, further including the following step after step d) of forming said laser active layer:

(e) forming a thin n-doped layer to said laser active layer protect said laser active layer.

4. (Currently Amended) The method of Claim 1, after the burying step (g), further comprising: claimed in claim 1, further including the following step after step (g) of burying said ribbon:

(h) depositing a metallization layer on top of said burying layer.

5. (Currently Amended) The method of Claim 2, after the masking step (g2) of depositing a dielectric material insulating layer, further comprising: claimed in claim 2, further including the following step after said step (g2) of depositing a dielectric material insulating layer:

(h') depositing a metallization layer on top of said etched burying layer.

6. (Currently Amended) ~~A method of~~ The method of Claim 4, after the providing step
~~(a), further comprising: fabricating a semiconductor laser structure as claimed in claim 4,~~
~~further including: the following step (a) before the step (b) of depositing said confinement layer~~
~~on top of said III-V material substrate:~~

(a) epitaxially growing a p-doped contact layer on said III-V material substrate,
implanting protons in portions of the p-doped layers.

~~and the following steps (k) and (l) after said step (h) of depositing said~~
~~metallization layer:~~

~~(k) overturning said wafer onto a second wafer and eliminating said substrate[[,]]; and~~

and

~~(l) depositing a metallization layer on top of said contact layer.~~

7. (Currently Amended) The method of Claim 4, after depositing of
metallization layer (h), further comprising: A method according to claim 6 of fabricating a
semiconductor laser structure, further including a step of implanting protons in portions of the
p-doped layers.

(k) overturning said wafer onto a second wafer and eliminating said substrate[[,]]; and

and

(l) depositing a metallization layer on top of said contact layer.

8. (Currently Amended) A structure, comprising: buried ribbon laser including
a III-V substrate (3-1);
a non-doped buffer layer overlaying the III-V substrate (3-2);
a p-doped contact layer (15) overlaying the non-doped buffer layer;
a p-doped confinement layer (16) overlaying the p-doped contact layer;

a thin n-doped layer (17) overlaying the p-doped confinement layer;

an active layer (4) overlaying the thin n-doped layer;

a thin layer of non-doped layer (18) overlaying the active layer; wherein a rectangular-shaped mesa is formed by etching the thin n-doped layer, the active layer, and the thin layer of non-doped layer, the rectangular-shaped mesa having a first lateral (top) surface, a second lateral (a first side) surface, a third lateral (a second side) surface, and a fourth lateral (bottom) surface, the thin n-doped layer separating the p-doped confinement layer and the active layer so that there is no migration of p dopant toward the active layer, the etched portion of the active layer being referred as a ribbon; and

an n-doped burying layer surrounding the first, second and third lateral surfaces (42, 43, 44), and the fourth lateral surface (41) by the thin-n-doped layer (17).

~~a longitudinally extending laser active ribbon forming part of a buried mesa, said ribbon having a transverse width and four longitudinally extending lateral faces, i.e. a top face, a bottom face, and two faces joined to the top and bottom faces, wherein said lateral bottom and top faces of said ribbon are adjacent only an n-doped layer.~~

9. (Previously Cancelled) The buried ribbon laser claimed in claim 8 wherein said lateral faces joining said top and bottom faces are also adjacent only an n-doped layer.

10. (Original) The buried ribbon laser claimed in claim 8 wherein an n-doped layer less than 1m thick separates said ribbon from a p-doped layer.

11. (Original) The buried ribbon laser claimed in claim 8, including portions perpendicular to the planes of said top and bottom faces of said ribbon of a dielectric material layer on either side of said mesa incorporating said ribbon.

12. (Original) The buried ribbon laser claimed in claim 11 wherein the dielectric

material layer portions on either side of said mesa incorporating said ribbon are separated from each other by a distance substantially equal to four times the width of said ribbon.

13. (Previously Added) The method claimed in claim 1, wherein said thin layer is less than 1 μm thick.